

Abstract of the disclosure

Silicon dioxide (SiO₂) films are deposited at room temperature using a chemical vapor deposition (CVD) reaction catalyzed by ammonia or a Lewis base. The SiO₂ film growth is accomplished through the reaction of water and certain silicon precursors. Examples of these reactions include the $\text{SiCl}_4 + 2\text{H}_2\text{O} \rightarrow \text{SiO}_2 + 4\text{HCl}$ or $\text{Si (OR)}_4 + 2\text{H}_2\text{O} \rightarrow \text{SiO}_2 + 4\text{ROH}$ reactions and catalyzed with ammonia (NH₃) or other Lewis bases. The NH₃ catalyst lowered the required temperature for SiO₂ CVD from > 900 K to 313-333 K and reduced the SiCl₄ and H₂O pressures required for efficient SiO₂ CVD from several Torr to <500 mTorr.

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